



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

July 24, 2002

The Honorable Edward J. Markey
United States House of Representatives
Washington, D.C. 20515-2107

Dear Congressman Markey:

I am responding on behalf of the U.S. Nuclear Regulatory Commission (NRC) to your letter of June 11, 2002, requesting information related to the security of radioactive irradiators used in the United States. I refer you to the enclosure that provides detailed answers to each of your questions.

If you have further comments or questions, please contact me.

Sincerely,

Richard A. Meserve

Enclosure: Responses to Questions

Questions on Security of Radioactive Irradiators

Question 1: Are individuals who have access to these materials required to undergo criminal and security background checks to ensure that they do not pose a security risk? If not, why not? If there are different regulations for different amounts of radioactivity, please describe the regulations for each category of material.

Answer:

Individuals with access to irradiators are not currently required by NRC to undergo criminal or security checks. Prior to the September 11 terrorist attacks, the risk of intentional misuse of the radioactive material was considered to be very low. However, following the September 11 attacks, NRC advised licensees, including irradiator operators, to increase security measures, including additional controls on persons and materials entering the irradiator facilities. NRC is currently evaluating additional security measures to be implemented by licensees.

Question 2: Please describe the physical security measures (locks, guards, etc.) used to safeguard these materials. If there are different regulations for different amounts of radioactivity, please describe the regulations for each category of material.

Answer:

There are two major types of irradiators: self-shielded irradiators and panoramic irradiators.

Self-shielded irradiators are cabinet-sized units, with heavy steel and lead shielding surrounding the source and interlocks designed so that the operator cannot inadvertently place any part of the body in the irradiation chamber while the source is exposed. These large, heavy units are subject to general security requirements in NRC regulations 10 CFR 20.1801 and 1802, which require that radioactive sources must be secured against unauthorized removal or access. This means that the irradiators must be kept in a locked room, or be kept under constant surveillance by authorized persons if they are not in locked storage.

Panoramic irradiators are large, specially-built facilities with irradiation rooms large enough for persons to enter. These facilities are used to expose large quantities of products. The rooms used to expose products to the large sources typically have walls that are several feet thick and made of reinforced concrete. Security requirements are specified in 10 CFR 20.1801 and 1802, as discussed above. The radioactive sources are contained in a locked room when no authorized person is present. This locked room is typically contained in a locked building. In addition, access controls are specified in 10 CFR 36.23 and 36.65, and include locked barriers, alarms, interlock systems to prevent entry when the sources are exposed, keyed control panels, and attendants to prevent unauthorized access. Generally, shielding required to remove even one source from such an irradiator is very bulky and heavy and requires heavy equipment. Any attempt to remove a source without shielding would lead to prompt fatality.

Enclosure

Question 3: Are individuals who are making deliveries (or transporting the shipments that are being irradiated) to large irradiator/sterilization facilities required to undergo criminal and security background checks to ensure that they do not pose a security risk? If not, how can you be certain that a truck driver charged with delivering a shipment of food or medical equipment for sterilization does not pose a risk of planting a conventional bomb in the shipment to be delivered into a facility?

Answer:

NRC does not currently require individuals making deliveries of products to be irradiated to undergo criminal or security checks. However, following the events of September 11, 2001, NRC concluded that certain actions could be readily implemented by the licensees and would add significant value in addressing potential threats. Licensees involved with transport of very large quantities of radioactive material were advised to provide heightened surveillance and control over any shipments to prevent unauthorized access to the vehicle or package, and to limit the potential for theft or sabotage of the shipment. NRC urged licensees to take additional specific steps in a safeguards advisory directed specifically to licensees who prepare or receive shipments of Highway Route Control Quantities of Atomic Energy Act materials. Licensees have been following these advisories. This has primarily involved shipments of large quantities of Cobalt-60 to and from large irradiators. Consistent with our approach in other areas, the Commission will soon be issuing orders to bring these advisories within our normal regulatory framework and later this year will issue a proposed rule that will permanently amend our regulatory framework for transportation of large quantities of byproduct material. We will continue to collaborate with the Department of Transportation with respect to issues involve transportation safety and security.

Question 4: Are all shipments that are being delivered to irradiation/sterilization facilities searched to ensure they do not contain explosives? If not, how can you be certain that a shipment does not contain conventional explosives in the shipment that will then be detonated upon entry to the facility?

Answer:

The procedures for irradiating commercial products require that the product and packaging be known prior to processing to assure that proper irradiation will take place. Consequently, the licensee may perform a check of the product and packaging to verify the content. Irradiation of explosive materials is prohibited under 10 CFR 36.69 unless the applicant has received prior written authorization from the NRC. As stated previously, licensees have been advised to increase security measures on materials entering an irradiator facility and the NRC is evaluating additional security measures to be implemented by licensees.

Question 5: Please describe the manner in which the NRC and/or Agreement States ensure that licensees of these materials keep them secure. Are audits performed to ensure that all the materials can be accounted for? If so, how often? If not, then how do you know that all the materials are where they should be? Are these sources identified with serial numbers or some other means of identifying them if they are lost? If not, why not, and do you intend to implement such a system in the future?

Answer:

Licensees are required to verify that no sources have been lost when sources are added to, removed from, or moved within the irradiator, or at a minimum of every 3 years. Licensees also maintain records that include information about the radionuclide; the activity and date of measurement; manufacturer's or distributor's name, model number, and serial number; and the location of each source. Receipt, transfer, and disposal records must be maintained for as long as the material is in the licensee's possession and 3 years after transfer or disposal. These records typically contain dates of transfer or disposal, name and license number of the recipient, and a description of the affected radioactive material (radionuclide, activity, manufacturer's or distributor's name, model and serial number). Irradiator licensees are inspected on a periodic, routine basis by NRC and the Agreement States. Self-shielded irradiators are normally inspected every 3-5 years, and panoramic irradiators are inspected every 1-2 years. Accountability and security of the sources is covered as part of these inspections.

As indicated in the above description, the sources do contain serial numbers so that they can be traced in the event of loss.

Question 6: Has the NRC conducted or funded any studies or analyses on the public health, safety, and environmental risks of a terrorist attack on an irradiation/sterilization facility? If not, why not? If so, what are the worst-case risks of such an attack? Please provide copies of all studies or analyses prepared by or for NRC on this subject.

Answer:

NRC did not conduct or fund such studies in the past because the risk of a terrorist attack was considered low. During the licensing application review for irradiation/sterilization facilities and during construction and pre-operational inspection, NRC does perform analyses of the facility and equipment to assess whether the public health and safety are adequately protected and to minimize danger to life and property. NRC is currently evaluating a proposal to perform a study on the risks and consequences associated with a terrorist attack on an irradiator facility. We intend to conduct such studies as part of our enhanced program on security-related matters.

Question 7: Does NRC believe the dirty bomb scenarios described in the FAS study to be credible, and the posited health, safety, and environmental consequences to be accurate? If so, what action is the NRC taking to address these possible attack scenarios? If not, please indicate the basis for disagreement.

Answer:

NRC agrees that the terrorist use of the type of radioactive material utilized in the first and third scenarios (a lost source and a well logging source) of the FAS study is possible, although the Commission does not agree that the magnitude of the contamination and health, safety and environmental consequences of the contamination would be as extensive as postulated in the study. We do not agree that there is a high risk that the area contaminated by a radiological attack would have to be condemned.

NRC believes that the second scenario -- obtaining a source from a food irradiation facility -- is highly improbable. Such sources are largely self-protecting because of the need for heavy shielding to prevent rapid accumulation of a lethal dose that would disrupt the terrorists' capacity to use the source in a weapon. Moreover, food irradiators are large, mechanically complex facilities, and the large sources used in such facilities are protected by the reinforced concrete irradiation room. In addition, the irradiation facilities are equipped with security systems. The sources can only be removed safely by an intricate and lengthy procedure. The procedure involves the use of heavy equipment and special tools to protect the workers from excessive radiation exposure. Removing the sources is time and labor intensive, and potentially dangerous. Consequently, because irradiator sources are not susceptible to easy theft and are very dangerous to handle, it is highly unlikely that they would be used to construct a dirty bomb.

Moreover, if somehow all these problems were overcome and a cobalt "pencil" were used in a radiological dispersal device, NRC does not agree with the assumptions used in the FAS report to estimate the resultant radiation exposures and contamination. In predicting the effects of the device, the study assumed that the debris produced by the explosion will be readily carried by the wind, and will thereby contaminate a large area. For this to occur, it is necessary to assume that the explosion will produce a radioactive cloud in the form of a very fine powder, which is inconsistent with the physical properties of cobalt, or that the cobalt had been treated chemically beforehand -- presumably in a hot cell -- to ensure production of a fine powder by the explosion. Without such a fine powder, transport by the wind will not occur effectively because the particles produced by the explosion will be relatively large and will quickly settle to the ground. This would result in the contamination of a much more limited area.

Following the events of September 11, 2001, NRC and the States issued advisories recommending that licensees increase security measures, be alert to any unusual activities which might indicate a terrorist threat, and report any suspicious activities to local law enforcement, the FBI, and NRC. NRC is evaluating additional security enhancements and will implement additional requirements as appropriate. Measures include enhancements to alarm systems, barriers, guards, background checks, transfer controls, and import/export controls. Also, since September 11, NRC has expanded its level of interagency coordination with respect to counter-terrorism.